DESIGN IN-CONTEXT

Unit 5 | Design Proposals 1

Duration: 5 Weeks | Sep 19th - Oct 23th

Introduction: This project aims to integrate biomimicry into product design, unintentionally imparting educational information to individuals.

Blurb: This project focuses making white ceramic spice jar sets inspired by the **vibrant rhythms of coral formation**, raising awareness about coral **bleaching**, and cultivating a dedication to ocean protection. My goal is to build linkages between common objects and environmental consciousness by merging design aesthetics and functionality.

CURRENT SITUATIONS

Reevaluating the Items Around Us

During my investigation into the current spice jar sets available on the market, I noticed that most of them had rather boring designs and little visual appeal. Tabletop spice jar sets, in my opinion, ought to combine **practicality** with the ability to **function** as fashionable accent pieces that can double as sculptures when not in use. The spice jars become the center of attention as people gather around the table to wait for their meal. Thus, it's a great idea to use these spice jars as educational tools to spread awareness about coral conservation.

In many contemporary restaurants, nearly every seasoning jar on the table has its own unique aesthetic. The overall set appears disorganized without careful arrangement.

Figure 1

Figure 2

Many household jars feature designs that are frequently uninspiring, lacking a distinct sense of originality.

Even among well-designed seasoning jars, there is a **lack of interaction** between them.

Figure 3

Figure 4

Every jar should embody style, elegance, and simplicity, ensuring that the entire set maintains its **aesthetic appeal** even in a state of chaos.

ABOUT CORAL BLEACHING

Coral bleaching is when coral reefs lose their color due to **expelled symbiotic algae**, caused by factors like higher sea temperatures and pollution. This weakens the coral and threatens their survival, impacting the ecosystems they support.

WHAT

Bleaching is caused by **environmental changes**, mainly due to **human activities** like overfishing and ocean pollution. These disruptions upset the balance in coral ecosystems, resulting in the loss of color and vitality in the reefs.

WHY

Figure 5

From colorful to white to brown

HOW

HOW THIS RELATED TO MY DESIGN

1. Using white ceramics to reflect the severity of coral bleaching issues.

2. Using condiment containers at the seaside seafood restaurant served as a reminder to the visitors to protect the ocean.

3. Simulating the group growth behavior of corals gives the set of products an overall aesthetic of dynamic growth.

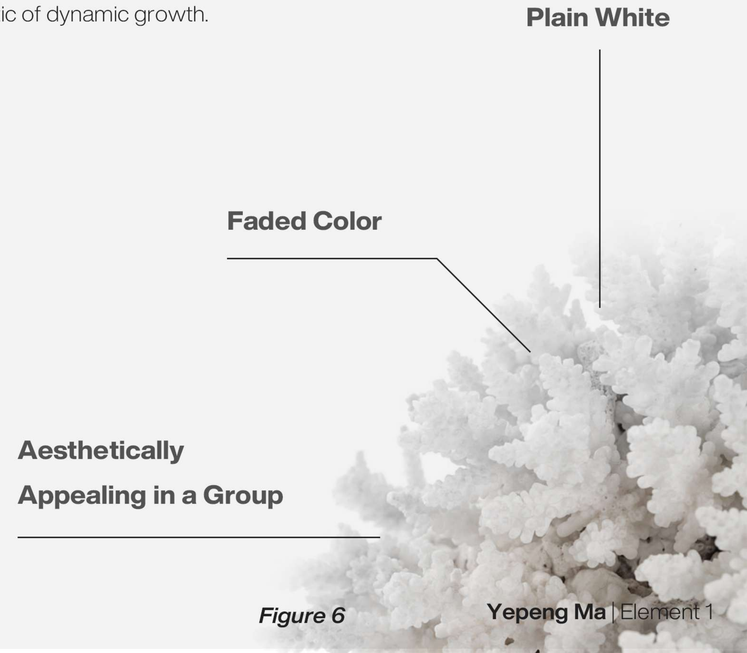


Figure 6

INSPIRED BY BIOPHILIC BEAUTY

Designing the product in a **set**

Figure 7 "Vitality"

Focusing on flowing freely **curves**

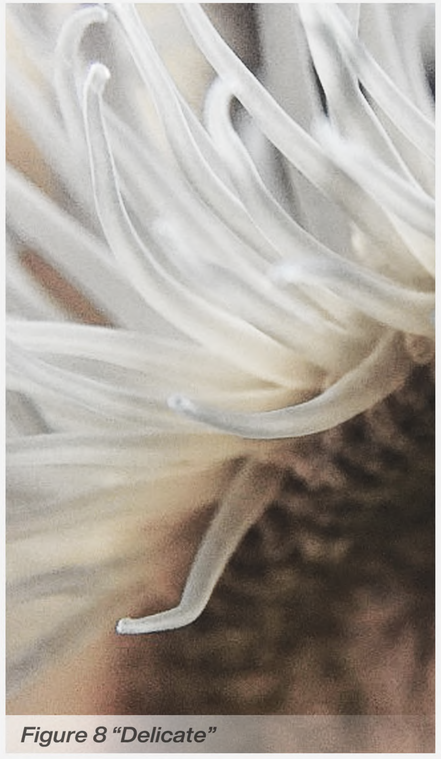


Figure 8 "Delicate"

Using **ceramics** to evoke warmth elegantly

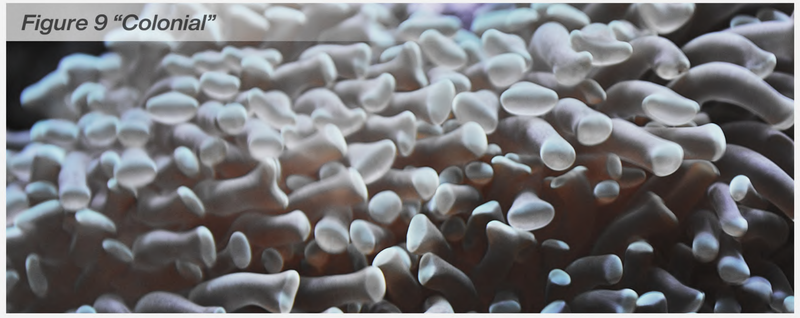


Figure 9 "Colonial"

Figure 10 "Bleached Out"

Reflecting the **bleaching** problem with a white and fading colors

Incorporating Nature into Design

My inspiration at first came from the fascinating world of **coral in its natural habitat**. The vertical development of coral formations evoked images of the beautiful sweep of free-flowing curves, while the coral's clean white texture provided a mental bridge to the domain of ceramics. While seeing the clustered development patterns of coral, I was struck by the idea of a family of forms within the framework of design, where pieces interact and survive together. Furthermore, the bleached coral, which had been damaged by environmental stress, evoked feelings of immaculate whiteness and the slow, almost poetic fading of gradients in the natural world.

HISTORICAL CONTEXT

Influenced by Existing Products

By researching similar products already available in the market, I found valuable inspirations. For instance, the "Mushrooms Set" and "Ajori Garlic Set" in the left image not only paid attention to the individual bottle designs but also created a delightful overall aesthetic. These examples were a great source of inspiration. Additionally, the interaction between the two embracing figurine-shaped bottles in Figure 18 was particularly intriguing.

The designs of the bottles in Figures 11, 13, and 17 were influenced by objects such as vases and sculptures, which inherently possess decorative qualities. This design approach undoubtedly bestows the condiment bottles with a graceful and elegant appearance, making them suitable for use as decorative items on the tabletop when not in used.

Figure 11

Figure 12

Figure 13

Figure 14

Figure 15

Figure 16

Figure 17

Figure 18

Figure 19

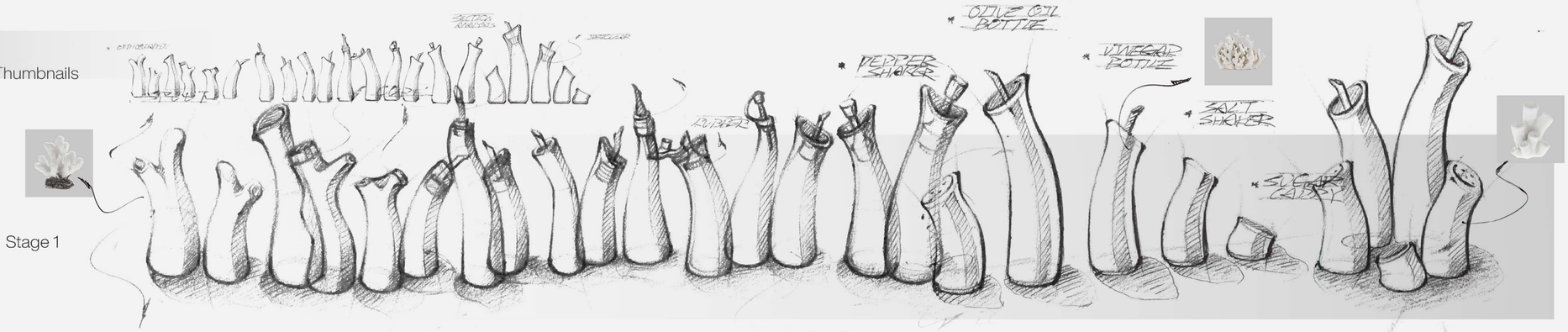
CONCEPT SKETCHES

Fostering Concepts

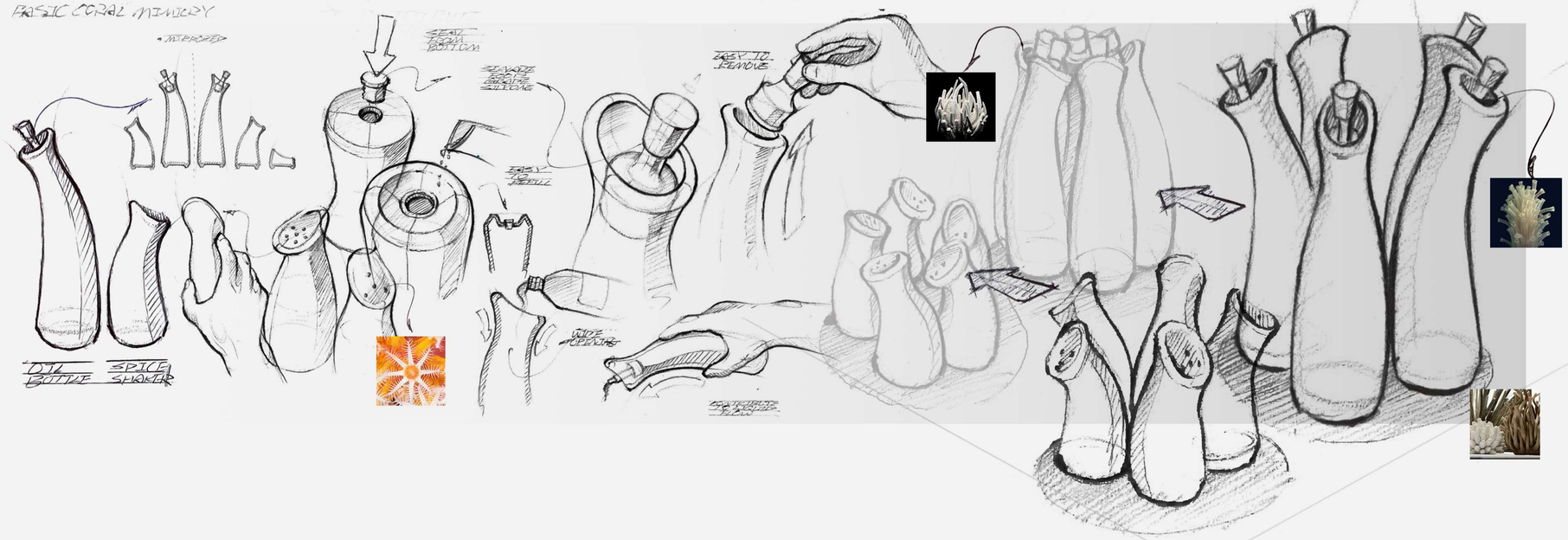
There were **three** separate stages in my sketch development process. I began the process by quickly drawing a succession of side views, which I then converted into three-dimensional objects. I progressively refined the ideas into sleek and graceful forms, starting with the nuances inherent in coral's unique intricacy. Concurrently, I refined the concepts by meticulously analyzing the molds necessary in the real production process. The end outcome of this expedition was two sets, each made up of five **identical** bottles. The higher set is for **liquid condiments**, and the shorter one is for **powdered spices**. Simple **rotations** enable adjustments in storage volume and visual form, mimicking the dynamic beauty of **coral expanding and contracting**.

Thumbnails

Stage 1



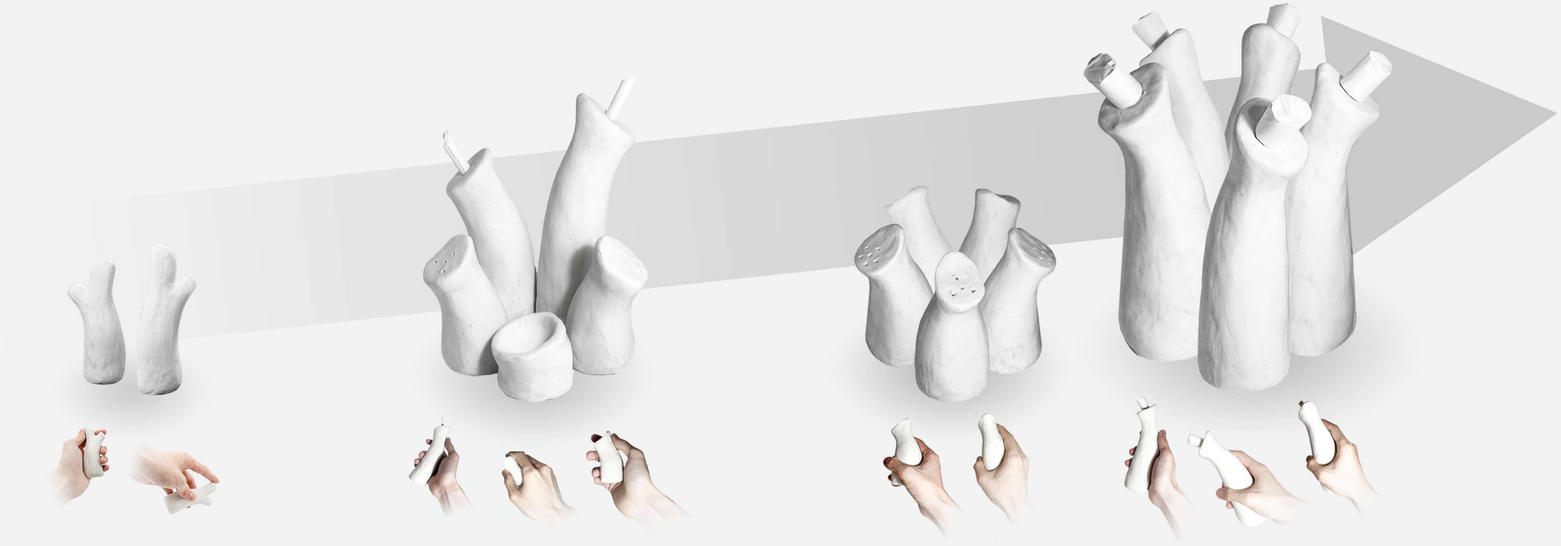
Stage 2



MODELS MOCK-UP

I created models for three different concepts using white **plastic clay** and **paper rolls**. The first concept aimed for a realistic coral representation with a double-headed oil bottle simulating coral forms, but it lacked elegance and was material-intensive. The second concept simplified the single oil bottle's design, achieving a minimalist and elegant look while retaining dynamic coral characteristics through varying bottle lengths. This concept included five spice containers: olive oil, vinegar, salt, pepper, and a sugar packet holder, requiring at least four plaster molds for the full ceramic set. In the last concept, I used the same bottle rotated into groups, reducing production costs and time while preserving the beauty of coral formations..

Simultaneously, I conducted **ergonomic experiments** on each concept, shaping clay into similar forms to assess practicality by evaluating the comfort of the grip.



	Concept 1	Concept 2	Concept 3 (THE BEST)
PROS	• cap for fingertip placement • effective biomimetic simulation	• contain multifunctional jars • rhythmetic design	• ergnomic to hold • multipal jars for different spices • effective biomimetic simulation
CONS	• dual heads cause material wastage • aesthetic lacks elegance • limited interactions in a set	• hard to manufacture • wide bottle neck makes wide seals	• relatively, a set contains fewer types of spice jar designs

FEASIBILITY ASSESSMENT

Evaluating the Viability of My Concept

Using **PLA 3D printing** for life-sized models provided a practical means to validate my hypotheses and product dimensions. This involved confirming the compatibility of the bottle cap-to-bottle opening sizes and assessing the dimensions of the spice bottle bottom openings. The food-grade silicone seal costs £3, while the resin stopper for the spice shaker is priced at £2.59.

Furthermore, the product's design adheres to ergonomic standards. Both the oil bottle and powder shaker are designed with pistol grips in mind. Specifically, when pouring liquid from the oil bottle, there is no need to tilt it beyond 90°.

MATERIAL CHOICE

Why I Chose Ceramic?

Initially, ceramics are **naturally warm and gentle**, making them excellent for manufacturing daily home objects. Because of their natural visual appeal and tactile features, they are a first option for goods such as dinnerware, which improve the entire ambiance of a living environment.

Second, ceramics are well-known for their **food-safe qualities**. When these materials come into touch with food or beverages, they do not leach dangerous compounds, guaranteeing that they fulfill high food safety regulations. This dependability is critical when building items for culinary applications since it guarantees that consumers' health and well-being are not jeopardized.

Finally, ceramic plaster molds are great for **producing intricate and elaborate designs efficiently**. This technology is capable of producing accurate and complicated forms that are typically difficult to recreate using other materials such as plastic, glass, or metal. It offers a low-cost, scalable option for producing intricate and creative ceramic patterns at scale.

Figure 20 "Gentle"

Figure 21 "Mass Production"

Figure 22 "Food Safe"

POP-UP SHOP

Fitting in the Pop-up Shop

Pop-up stores are known for their exclusive and limited-time product selections. My unusual coral-inspired spice jars, I believe, have the ability to capture clients, whether they want a single jar or a set of them. The **visual attractiveness** of these works is enticing, and they may act as a magnet to lure visitors into the business. Aside from their visual appeal, the **functionality** of these jars assures that they are more than just ornamental pieces.

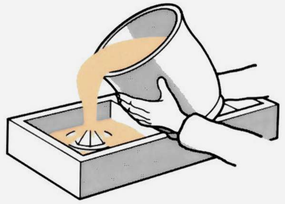
Furthermore, the pop-up shop concept provides an great platform for **storytelling**. Here, I can share the story of how these spice jars came to be, as well as shine awareness on the subject of coral bleaching and the need of ocean conservation. This additional layer of significance adds to the project's value and connects with buyers who value items with a meaningful message.

Figure 23. Pop-up Shop Scenarios

MANUFACTURE PROCESS OVERVIEW

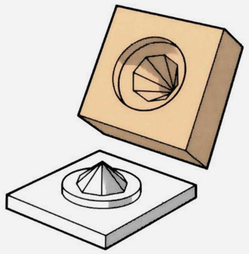
Mixing

Mix the mold material by gradually adding it to the measured water while stirring until it reaches a smooth, clump-free consistency.



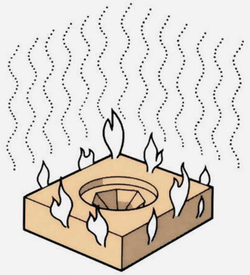
Pattern

Creating a pattern typically involves designing, shaping, and, if necessary, adding a sprue to the chosen material, applying mold release, setting it in a container, and finally, mixing and pouring the mold material.



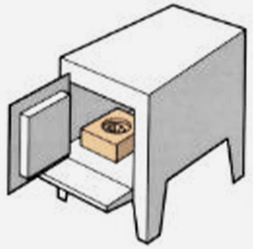
Stripping

The stripping step in ceramic mold casting involves carefully removing the outer mold shell and the pattern from the mold, followed by any necessary cleaning and inspection.



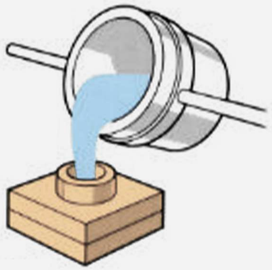
Burnoff

The mold burnoff step in ceramic casting involves subjecting the ceramic mold to high temperatures, typically in a kiln, to burn off the organic materials, such as wax or resin, leaving behind the cavity into which molten metal will be poured.



Baking

The baking step typically involves placing the ceramic mold in a kiln or oven and subjecting it to controlled high temperatures to cure or harden the ceramic material and prepare it for the casting



Casting

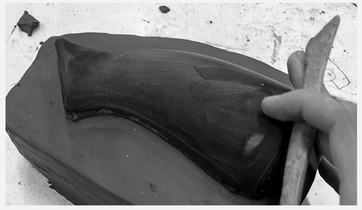
The casting step in ceramic mold casting involves pouring or injecting the molten material, such as metal or liquid ceramic, into the prepared mold cavity to create the final object or part.

https://www.open.edu/openlearn/science-maths-technology/engineering-technology/manupedia/ceramic-mould-casting

MANUFACTURING PROCESS

Creating the First Molds

I began the procedure by 3D-printing a life-sized model. This proved to be a useful starting point for creating the plaster molds.



1. Embed the 3D-printed model in clay halfway.

2. Trim clay edges to achieve 90-degree surface angle.

3. Clean the surface for a smooth and even finish.

4. Apply a thin layer of Vaseline after cleaning.

5. Surround with clay walls twice as high as the base.

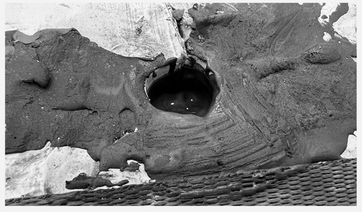
6. Apply Vaseline to rest top area, and add a tube at rear.

7. Pour the prepared plaster.

8. After the plaster has cooled, flip it over and repeat steps 5-6.

9. After the plaster has cooled, flip it over and repeat steps 5-6.

10. Thoroughly mix the slip until it's uniformly viscous.



11. After securely tying the plaster mold, pour the slip evenly inside.

12. After letting it sit for about one hour, proceed to demold.

Creating the Second Molds

13. Embed the 3D-printed model in clay halfway.

14. Fine-tune clay contact points for a slight touch.

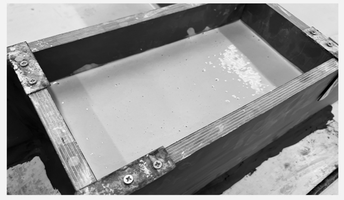
15. Trim clay edges to achieve 90-degree surface angle.

16. At a tube at the opening.

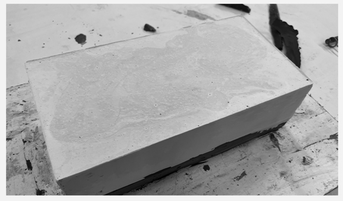
17. Set up wooden boards all around.

18. Apply a layer of clay in the gaps between the wooden boards to secure them.

19. Pour plaster to a 2.5cm submersion depth.



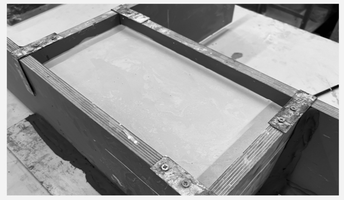
20. Allow the plaster to dry by letting it sit.



21. Remove the barriers after full setting.

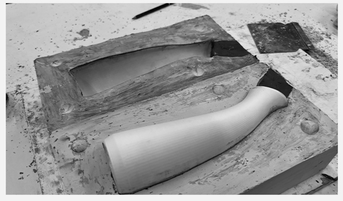
22. Apply a layer of soapy water on the plaster surface.

23. Flip the plaster over and repeat steps 5-6.



24. Allow the plaster to dry by letting it sit.

25. Refine the plaster surface for a smooth finish.



26. Open the mold to allow it to dry.

27. Pour the slip into a measuring cup.

28. Thoroughly mix the slip until it's uniformly viscous.

29. After securely tying the plaster mold, pour the slip evenly inside.

30. After letting it sit for about one hour, proceed to demold.

REFLECTION & EVALUATION

What Went Right?

As for the **design** itself, it has profound personal meaning for me and resonates on several levels. It primarily addresses the enormous demand for diverse and spacious spice containers, efficiently meeting consumers' expectations. A second notable aspect is its inherent flexibility, which allows for easy arrangement alterations with a simple twist of the spice jars, creating a unique and user-friendly experience. Furthermore, the use of white porcelain serves a dual function, not only as a medium for creative expression but also as a platform to raise awareness about the serious issue of coral bleaching, emphasizing the project's dedication to environmental education and conservation.

In terms of **production**, I was well-prepared in the project's early phases. I examined four distinct possibilities during the early phase, taking into account manufacturing time, difficulty, and cost. Through this sequence of trials, I was eventually able to create a high-quality product.

What Went Wrong?

For starters, I did not perform extensive study on the complete ceramic production process in advance, which resulted in an **unequal allocation** of time across the project. Because each stage of ceramic processing is both time-consuming and essential, the project should have spent less time on early preparation and more time on manufacture. Second, slip casting proved to be the most difficult stage during the entire procedure. Due to my lack of knowledge and experience, I failed to successfully manage the **wall thickness** of the jars, resulting in heavier end products. Finally, my **impatience** showed throughout the mold-making procedure. I attempted to make 12 molds using slip casting, but only 5 of them were successful. The remainder were harmed during the demolding process.

CONCLUSION

How's My Overall Experience?

Overall, this project is the result of a creative journey aimed at building a profound aesthetic relationship between the enticing coral form and the functionality of two distinct sets of spice jars, all produced in the exquisite white ceramic media Become. A comprehensive research of similar items on the market sparked the spark of imagination that propelled the idea ahead.

My early designs were inspired by the intricacy of coral structures throughout the entire design process, resulting in a set of genuine coral-shaped oil dispensers. However, as the design process progressed, it transformed into a more streamlined and efficient idea with five distinct types of jars. Finally, the concept was realized in the form of five identical spinning cans. The concept's ultimate version outperforms its predecessors in terms of simplicity and mass production appropriateness, making it a more cost-effective and accessible alternative for customers.

This journey extends beyond the areas of imagination and creation. The manufacturing process's practical steps dig into the difficulties of hydrated lime mold creation and plaster mold casting. These stages brought a distinct set of obstacles as well as wonderful learning opportunities that expanded my knowledge of the trade.

The end outcome of this meticulous approach is more than simply a representation of artistic vision and practicality. It is a tribute to the whole design process and its dedication to bridging the gap between the interesting nature of coral reefs and customers' everyday lives. Not only does the project bring the beautiful beauty of coral into everyone's house, but it also tells a tale of endurance, creative progress, and accomplishing a goal to give a touch of elegance to daily areas.

Figure 24, eco-friendly package

Figure 25

REFRENCE

Ceramic mould casting (no date). https://www.open.edu/openlearn/science-maths-technology/engineering-technology/manupedia/ceramic-mould-casting.

Coral bleaching (no date). https://www.barrierreef.org/the-reef/threats/coral-bleaching.

Everything you need to know about coral bleaching—and how we can stop it (no date). https://www.worldwildlife.org/pages/everything-you-need-to-know-about-coral-bleaching-and-how-we-can-stop-it.

What is coral bleaching? (no date). https://oceanservice.noaa.gov/facts/coral_bleach.html#:~:text=When%20water%20is%20too%20warm,and%20are%20subject%20to%20mortality.

Figure 1 -20 Crew, T. (2018) three white vases on table, Unsplash. https://unsplash.com/photos/three-white-vases-on-table-iUFS1GCpEbk.

Goertzen Pottery (no date) Vase Side-Fired on sea shells. https://goertzenpottery.com/products/copy-of-side-fired-on-sea-shells-vase-3.